

### Abstract

A low resistance Co silicide layer with less leakage current is formed over the surface of the source and drain of a MISFET by optimizing the film forming conditions and annealing conditions upon formation of Co (cobalt) silicide. Described specifically, low resistance source and drain ( $n^+$  type semiconductor regions,  $p^+$  type semiconductor regions) with less junction leakage current are formed by, upon formation of a Co silicide layer by heat treating a Co film deposited over the source and drain ( $n^+$  type semiconductor regions,  $p^+$  type semiconductor regions) of the MISFET, depositing the Co film at a temperature as low as  $200^{\circ}\text{C}$  or less, carrying out heat treatment in three stages to convert the Co silicide layer from a dicobalt silicide ( $\text{Co}_2\text{Si}$ ) layer to a cobalt monosilicide ( $\text{CoSi}$ ) layer and then to a cobalt disilicide ( $\text{CoSi}_2$ ) layer successively.